**Pearson
Edexcel GCSE**

Centre Number

Candidate Number

Mathematics B
Unit 2: Number, Algebra, Geometry 1
(Non-Calculator)

Higher Tier

Thursday 4 June 2015 – Morning	Paper Reference
Time: 1 hour 15 minutes	**5MB2H/01**

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need*.
- **Calculators must not be used.**

Information

- The total mark for this paper is 60
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*****) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

Volume of prism = area of cross section × length
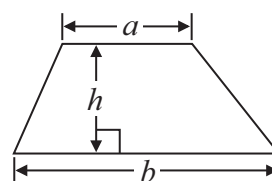
Volume of sphere = $\dfrac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$

Area of trapezium = $\dfrac{1}{2}(a + b)h$
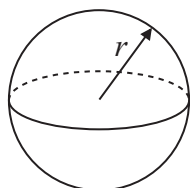
Volume of cone = $\dfrac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl
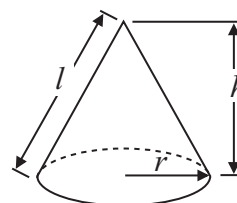
In any triangle *ABC*

Sine Rule $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\dfrac{1}{2} ab \sin C$
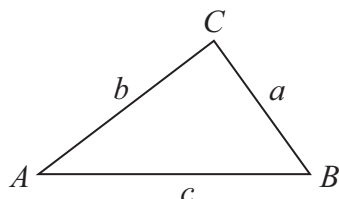
The Quadratic Equation
The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \dfrac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

P 4 4 7 9 1 A 0 2 1 6

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

You must NOT use a calculator.

1 (a) Work out $1\dfrac{3}{4} + 3\dfrac{1}{2}$

....

(1)

(b) Work out $\dfrac{3}{7} \times £28$

£...

(2)

(c) Estimate the value of 19.89×201.71

....

(2)

(Total for Question 1 is 5 marks)

2 On the grid, draw the graph of $y = 3 - 2x$ for values of x from -2 to 3
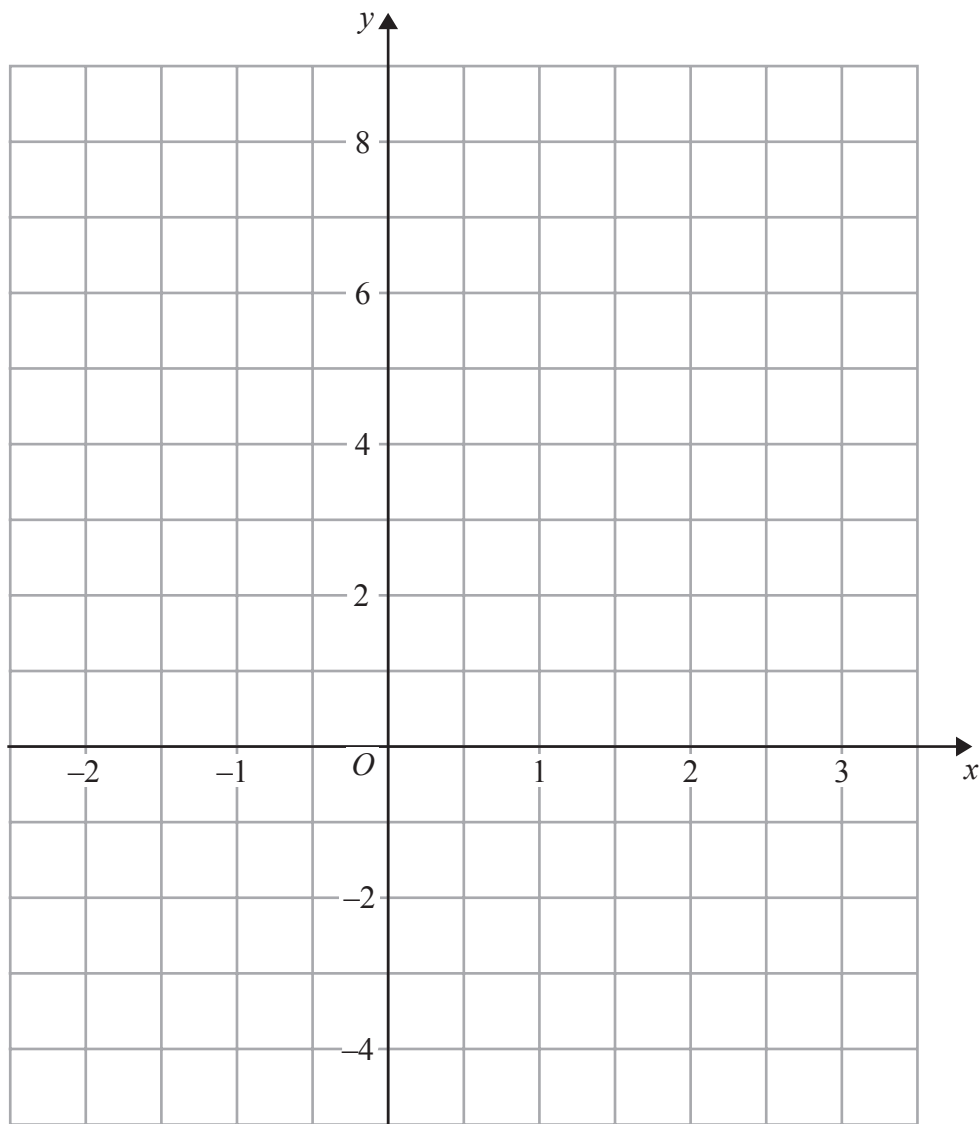
(Total for Question 2 is 3 marks)

3 The diagram shows a rectangular floor.

Diagram **NOT** accurately drawn

4.5 m

9 m
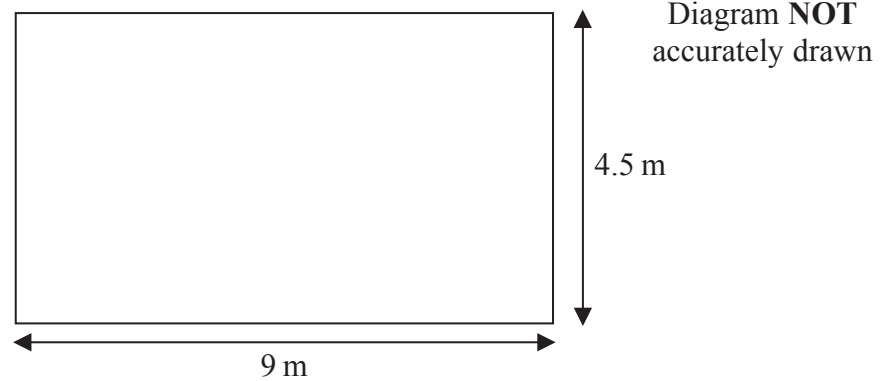
Toji is going to cover the floor with floor boards.
Each floor board is 0.1 m wide and 1.5 m long.

Work out the smallest number of floor boards Toji needs.

....

(Total for Question 3 is 3 marks)

4 The *n*th term of a number sequence is $2n + 1$

Write down the first 3 terms of the number sequence.

....

(Total for Question 4 is 2 marks)

5 The diagram shows a triangular prism.

Diagram **NOT** accurately drawn

6 cm

10 cm

5 cm
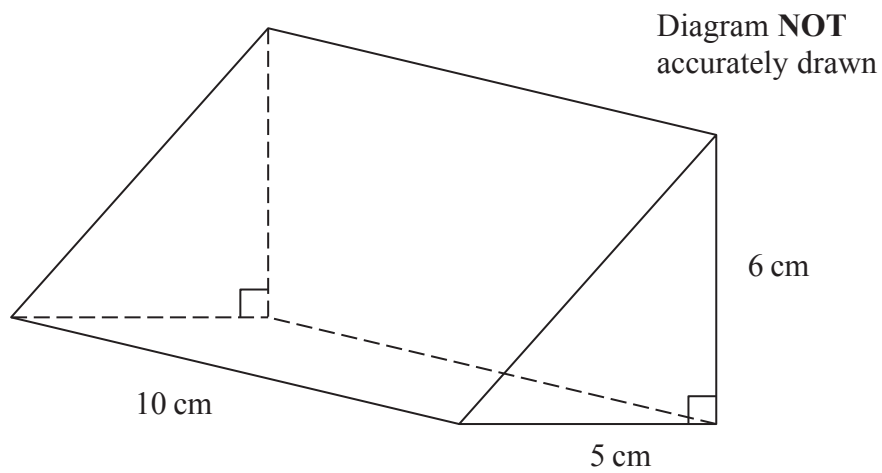
Work out the volume of the prism.

....

(Total for Question 5 is 3 marks)

6 Gary's motorbike uses petrol.

Gary needs to mix oil with the petrol.
He mixes oil and petrol in the ratio 1 : 14 by volume.

Gary is going to ride his motorbike 3000 miles.
Each 20 miles he rides uses 1 litre of the oil and petrol mixture.

A 500 m*l* bottle of oil costs £3.99

Work out the total cost of the bottles of oil Gary needs to buy.
(1 litre = 1000 m*l*)

You must show all your working.

£...

(Total for Question 6 is 4 marks)

7 (a) Expand and simplify $3(y-2) + 2(y+5)$

....

(2)

(b) Simplify $\dfrac{w^5}{w^3}$

....

(1)

(c) Factorise $5x + 20$

....

(1)

(Total for Question 7 is 4 marks)

8 Kim invested £2000 for two years.

By the end of the first year, the value of the investment was 15% more than its value at the beginning of the year.

By the end of the second year, the value of the investment was 10% more than its value at the end of the first year.

Work out the value of the investment at the end of the second year.

£...

(Total for Question 8 is 3 marks)

*9   In England the speed limit is 70 miles per hour.
     In Italy the speed limit is 130 kilometres per hour.

     Which country has the greater speed limit, England or Italy?
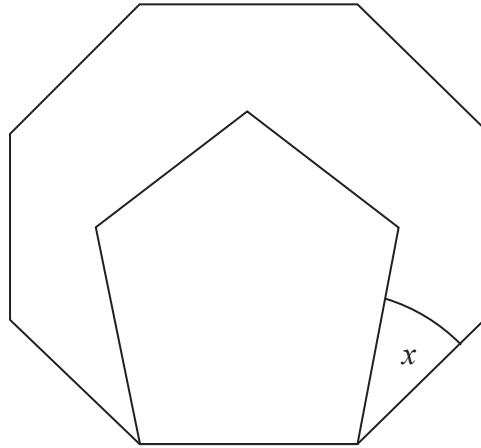   You must show your working.

(Total for Question 9 is 3 marks)

*10

Diagram **NOT** accurately drawn

The diagram shows two regular polygons.

Find the size of the angle marked *x*.
Give reasons for your answer.

(Total for Question 10 is 4 marks)

Turn over ▶

11 Write these numbers in order of size.
Start with the smallest number.

2.5×10^2 \qquad 0.0025 \qquad 2.5×10^{-2} \qquad 2500

....

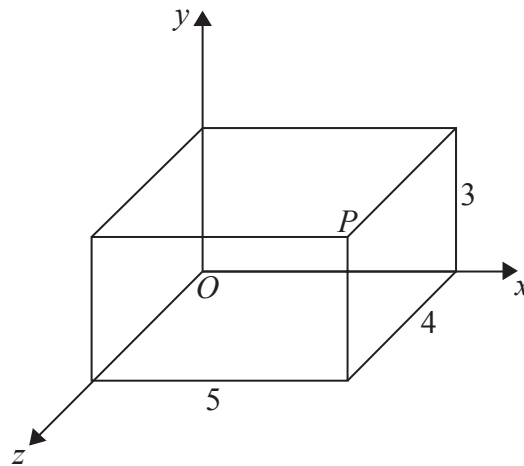**(Total for Question 11 is 2 marks)**

12

Diagram **NOT** accurately drawn

The diagram shows a cuboid drawn on a 3-D coordinate grid.
P is a vertex of the cuboid.

(a) Write down the coordinates of *P*.

(....................... , ... , ...)

(1)

The point *C* on the cuboid has coordinates (0, 3, 2).

(b) On the diagram, mark with a cross (×) the point *C*.
Label the point *C*.

(1)

(Total for Question 12 is 2 marks)
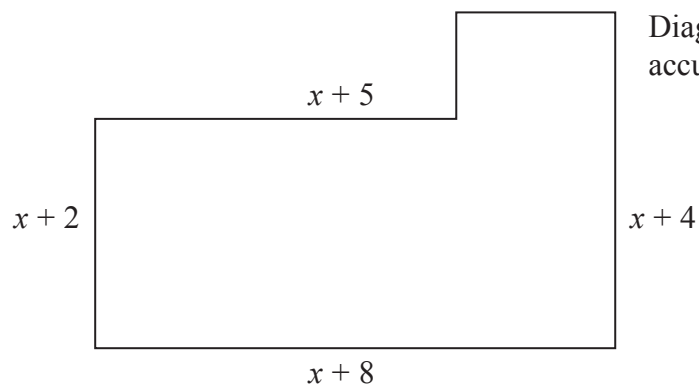
13 Here is a shape.

$x + 5$

Diagram **NOT** accurately drawn

$x + 2$

$x + 4$

$x + 8$

All the measurements are in centimetres.
All the corners are right angles.

The area of the shape is A cm².

Find a formula for A in terms of x.
Give your answer in its simplest form.

$A = $ ....

(Total for Question 13 is 4 marks)

Turn over ▶

14 (a) Write down the value of 6^0

....

(1)

(b) Work out $64^{-\frac{2}{3}}$

....

(2)

(Total for Question 14 is 3 marks)

15 (a) Factorise $y^2 - 5y - 14$

....

(2)

(b) Expand and simplify $(2\sqrt{5} + 1)(3\sqrt{5} - 1)$

....

(2)

(c) Write $\dfrac{6}{\sqrt{12}}$ in the form $\sqrt{n}$, where n is an integer.

....

(2)

(Total for Question 15 is 6 marks)

P 4 4 7 9 1 A 0 1 4 1 6

16 The points $A(6, 1)$ and $B(-2, 5)$ are on the line with equation $y = -\dfrac{1}{2}x + 4$
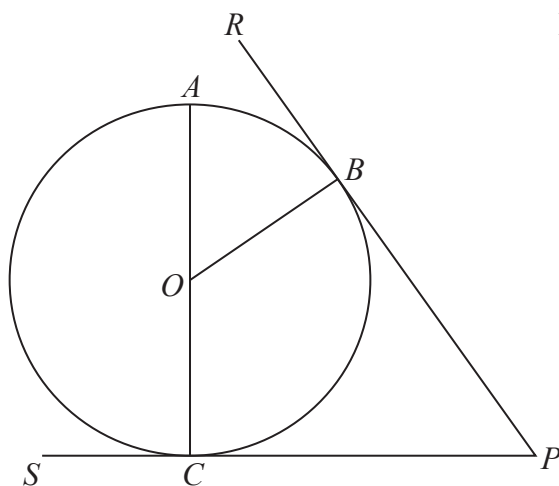
M is the midpoint of AB.

Find an equation of the line through M that is perpendicular to $y = -\dfrac{1}{2}x + 4$

(Total for Question 16 is 4 marks)

*17

R

Diagram **NOT** accurately drawn

A

B

O

S   C   P

A, *B* and *C* are points on a circle, centre *O*.

RBP is the tangent to the circle at *B*.
SCP is the tangent to the circle at *C*.
AOC is a diameter of the circle.

Prove that angle *AOB* is equal to angle *CPB*.
You must give reasons at each stage.

(Total for Question 17 is 5 marks)

TOTAL FOR PAPER IS 60 MARKS